

I must remark in conclusion that the very perfect specimen that I have just described probably represents a spike of fructification which had not reached its last degree of development. Two facts seem to indicate this: 1, the microspores, in nearly all the sporangia which contain them, are immersed in the midst of a granular opaque matter, in which they show by transparency, and which has the appearance of the cellular plasma that surrounds these organs before their maturity; and, 2, the vessels, which form very distinct bundles in the axis of the cone, only present transverse striæ or scarcely distinct rings, and not the strongly marked streaks of adult scalariform vessels.

This want of maturity has perhaps been favourable to the integrity of these fossils; but it is possible, and even probable, that the microspores and macrospores, when their development is complete, would present some differences which must not be regarded as arising from a really distinct organization. Some of the spores composing the triple microspore already appear disposed to become isolated, and would probably acquire the trigonal form indicated by J. Hooker for the spores of *Lepidostrobus*. Some of the macrospores also seem to present in their interior a more complex organization, which would indicate a tendency towards the form with a trigonal apex of the macrospores of *Isoëtes*.

Fresh specimens, even mere fragments, but at a different degree of development, will perhaps hereafter complete our knowledge of this subject; but from this day forth the existence of these gigantic Lycopodiaceæ, showing a still more complete relationship to certain existing forms of this family, is established indubitably.

BIBLIOGRAPHICAL NOTICE.

Observationes circa Pezizas Fennicæ. Scripsit WILLIAM NYLANDER.
Accedunt tabulæ II. lithographicae.

THE above treatise has been called forth by the work of Karsten entitled 'Expositio Pezizarum sibi cognitarum Fennicæ,' concerning which Prof. Nylander observes that the characters given are, for the most part, mere transcripts of those of Fries in the 'Systema Mycologicum,' with the addition of some occasional and vague remarks on the fruit. The author considers M. Karsten to have neglected the means he had at his disposal of verifying the species he describes, in not consulting collections of published specimens, such as those of Mougeot, Desmazière, and Rabenhorst, and states that he has himself acquired a more accurate knowledge of the subject from studying the specimens contained in the Museum of the Society for the

elucidation of the Fauna and Flora of Finland than from the work of Karsten, which, however, has had the effect of leading him to a careful examination of those species. He remarks that it is of much importance to science generally, as well as to the Finnish flora, that everything vague and uncertain should be eliminated, and more clearly defined notions acquired. Dr. Nylander considers the genus *Peziza* to have been more neglected than other genera of fungi, owing particularly to the difficulty of determining species, from the loose and unsatisfactory way in which they have been hitherto described.

The only existing monograph is that contained in the second volume of Fries's 'Systema Mycologicum,' where all microscopic analysis is omitted. Other difficulties arise from the rarity of many of the species, some occurring only in particular years and seasons, others in places difficult of access, many of their more marked characters being also lost in the process of drying for the herbarium. Hence arises, says the Professor, a necessity for more satisfactory definitions than at present exist, to enable the student to recognize the plants he meets with; and he hopes that the treatise under consideration may furnish descriptions which will aid the inquirer in overcoming the difficulties inherent in the subject, so far as the species contained in the 'Observationes' are concerned. After stating the number of species contained in Karsten's Synopsis to be 100, viz. 92 *Pezizæ* and 8 *Ascoboli*, several of which are not present in the Finland Museum, he notices some which are given by Karsten under wrong names, and adds others, from the collection in the Museum, omitted by that writer, giving figures of a few of the sporidia.

The chief value of Dr. Nylander's work consists in accurate measurements of the fruit of each species, with notes of the forms of the asci and paraphyses, and the appearances they present when treated with iodine. He also gives a few synonyms, remarking on the difficulty attending this part of the subject from the cursory way in which names have been assigned to the various forms, and shows the detriment arising to science from characters carelessly and loosely drawn up, and unaccompanied by minute analysis, and, on the other hand, the great value of clear and exact definitions of the various types. The Professor divides his materials into two grand series—the first containing the larger terrestrial species (*Aleuria*, Fries), the second the intermediate and minute forms. His first series is subdivided into such as have cylindrical asci with simple, elliptic fruit, showing no reaction under iodine, and others having globose fruit. Then follow those whose asci turn blue with iodine, which also present two sections, characterized by the form of their fruit. To these succeed the moderate-sized and minute kinds, subdivided into those having simple curved fruit (*Encælia* and *Dermatia*, Fries), and others with elliptic sporidia and cups either naked or setose and sessile (*Humaria*, Fries); a third section follows, with spherical or subglobose fruit; to these succeed such as have pilose or villous cups and oblong or fusiform sporidia (*Lachnea*,

Fries), first with stipitate and next with sessile cups; then come those species which arise from a subiculum or mycelioid stratum, divided into those with smooth cups and a flat disk (many of the *Helotia* of Fries), first, with distinctly stipitate, and, secondly, with shortly stalked cups; those with convex apothecia follow (*Helotia*, Persoon and Fries), then those with sessile, flat, or concave cups (*Mollisia*, Fries), and either seated on a subiculum or free, subdivided into those with furfuraceous (*Lachnea*, Fries) and those with smooth apothecia; they are either brightly coloured or hyaline (*Orbilina* and *Calloria*, Fries) and have paraphyses with claviform tips, or pallid and blackish, with simple fruit (*Mollisia*, Fries), or, again, have firm lichenoid cups and, frequently, septate fruit (*Patellea* and *Patellaria*, Fries).

Such is, in a few words, the nature of the sections and subsections which the learned author adopts. Experience alone, perhaps, will show whether his system will prove easier to the student than that of Fries: at first sight it certainly appears so; at all events there can be no doubt of the value of his concise and lucid descriptions of species and accurate measurements of the fruit. His aim has been to give, in as few words as possible, such characters as will enable the student to determine the specimen before him, avoiding, on the one hand, the vagueness of the older writers, and, on the other, the diffuseness and prolixity of later authors. It is to be regretted that there is no scale of measurements common to the scientific world; for the trouble of rendering in every instance fractions of French into those of English measures is so great as to render the work under discussion far less useful to an English botanist than it might otherwise have been. The dimensions of the fruit given by Dr. Nylander accord generally with those given by Messrs. Berkeley and Broome in the 'Annals of Natural History.' In a few cases, however, he appears to have different things in view: for instance, *Peziza brunnea*, A. & S., is described with spherical fruit; Corda, quoted by Dr. Nylander, in Sturm's 'Deutschland's Flora,' iii. ii. p. 68, t. 28, figures it as elliptic, and says "die Sporen sind eiförmig," &c.; so that the plant of Nylander must be different both from Corda's and also from that of Desmazière (Cr. Fr. ed. 1. 1312). The figure of Albertini and Schweinitz is also very unlike that of Corda.

Peziza asperior, Nyl., comes near to *Peziza trechispora*, B. & Br.; but the sporidia are "globose or subglobose;" in fig. 2 they are globose.

Peziza polytrichi, Schum. Dr. Nylander has evidently a different thing in view from the plant of the 'Annals of Natural History' for May and June 1854, No. 768, which is referred to *P. humosa*, Fr., in the 'Annals' for August 1866.

P. leucoloma, Hedw., is also said to have globose sporidia: in the plant of 'Engl. Flo.' they are bluntly elliptic. Nylander's plant would seem therefore to be distinct.

P. alboviolascens, A. & G.—The Professor remarks, in a note, p. 28, "Thecas sporas continentes ei nondum in speciminibus Anglicis, Gallicis, et Germanicis quæ examinare licuit inveni." It has

always appeared to us that this plant is a *Cyphella*; and we believe it to be identical with *C. Curreyi*, B. & Br.

Peziza subferruginea, Nyl. = *P. araneosa*, Sow.—Whatever Bulliard's plant may be, it cannot be identical with Sowerby's, as it agrees with it neither in characters nor in its place of growth.

Peziza geminella, Nyl., is remarkable for its 2-sporcd asci.

Peziza macrospora (Bagl.), Nyl. p. 66, seems to come very near to *Patellaria proxima*, B. & Br., the fruit corresponding closely.

Thirty-one new species of the genus *Peziza* are described, viz. :—*P. caligata*, Nyl.; *P. fluctuans*, Nyl. = *P. perlata*, Karsten; *P. furva*, Nyl.; *P. canina*, Karsten; *P. luteo-pallens*, Nyl.; *P. articulata*, Karsten; *P. fulvescens*, Nyl.; *P. asperior*, Nyl.; *P. improvisa*, Karsten; *P. juncifida*, Nyl.; *P. æruginella*, Karsten; *P. æruginascens*, Nyl. = *P. æruginosa auctorum*; *P. subferruginea*, Nyl.; *P. subspadicea*, Nyl.; *P. albiella*, Nyl.; *P. geminella*, Nyl.; *P. eucrita*, Karsten; *P. aureliella*, Nyl.; *P. subfurfuracea*, Nyl.; *P. hymeniophila*, Karsten; *P. luteo-rubella*, Nyl.; *P. rubinella*, Nyl.; *P. hyalinula*, Nyl.; *P. epipora*, Nyl.; *P. pteridina*, Nyl. = *P. pteridis*, Karsten; *P. lividula*, Nyl.; *P. atratula*, Nyl. = *P. atrata*, Fr.; *P. subcrenulata*, Nyl.; *P. amphibola* (Mass.), Hepp; *P. macrospora*, Bagl.; *P. variella*, Nyl.

Dr. Nylander describes some other fungi which come near the *Patellaria*-section of *Peziza*, hitherto only distinguished generically with difficulty, and gives characters, derived from the fruit, tending greatly to remove that objection, if they hold good throughout. The genus *Tympanis*, he observes, is characterized by dimorphism in the asci, the same apothecia containing asci filled with innumerable minute, curved sporidia, and others occupied by a few (eight to twenty-four) larger ones. A similar fact occurs, however, in certain *Nectrice*, as *N. cucurbitula*, Fr. and *N. inaurata*, B. & Br. M. Tulasne considers (*Carpologia*, iii. p. 87) *N. aquifolia*, B., and *N. inaurata*, B. & Br., to belong to one species; but it seems to us that the differences in the fruit, as well as in the perithecia, are amply sufficient to pronounce them distinct. *N. cucurbitula*, Fr., would appear to come much closer to *N. inaurata*, B. & Br., than would *N. aquifolia*, B. Dr. Nylander traced both forms of asci from an early stage to maturity, without perceiving any tendency in the minute curved bodies to unite and so form the larger kind of fruit, as De Notaris seemed to think, but each maintained its own form to the last. He also found spermagonia with spermatia. A fourth form of fruit occurred to Messrs. Berkeley and Broome in the case of *Tympanis saligna*, an account of which was published in Hooker's 'Journal of Botany,' 1851, vol. iii. p. 319, where fruit was found like that of *Diplodia*, unless it was founded on incorrect observation, as is suggested by M. Tulasne in the third vol. of his 'Carpologia,' p. 154.

The following new species of *Tympanis* are described :—*Tympanis confusa*, Nyl. = *Patellaria atrata*, Fr.; *T. spermatiospora*, Nyl.; *T. amphiboloides*, Nyl., and v. *hypopodiza*, Nyl.; *T. hypopodia*, Nyl.

The author has pursued the same method in his exposition of the *Pezizæ* of Finland as in his 'Lichenographia,' expressing in as few words as possible the essential characters of every species. He

considers that each part of their structure should be taken into account, with especial regard to their mutual differences, but that our knowledge of the *Peziza* is too limited at present to enable us to make use of the spermagonia as a means of systematic arrangement, a few scattered observations not sufficing to that end. He observes, however, that in cases of doubtful affinity an acquaintance with these bodies is of great value. The chief aim in descriptions should be that the various types may be easily distinguished, falling at once into their proper places.

A synoptic table of the Finnish *Pezizæ* follows, demonstrating the care taken by the author to render his treatise as complete and useful to the student as possible. Notices of a few species of *Ascobolus* are also added. This genus, he observes, differs but little from *Peziza*, the characters relied on as essential not being constant. Dr. Nylander proposes others, such as the fuscous-violet colour of the mature sporidia, and a peculiar reaction under iodine not apparent in *Peziza*, those bodies in *Ascobolus* assuming a more intense violet, whilst the asci turn pale blue, as in certain species of the former genus. The character of clavate or cylindrical asci he considers of little value, both forms often occurring in the same specimen, as the sporidia happen to form one or two rows—a remark in which we are disposed to concur. The distinct operculum of the asci is only found in a few species, and therefore not to be relied on. Only three species appear to be represented in the Finnish Museum, —*A. furfuraceus*, P., *A. glaber*, P., and *A. immersus*, P. In a note under *A. glaber*, P., he corrects the error of Coemans, who has cited *A. Kerverni*, Crouan, under that name. *Ascobolus macrosporus*, Crouan, is quoted as a synonym of *A. immersus*, P., which it does not much resemble so far as Persoon's figure is concerned, answering better to the description. Fries's characters of *A. porphyrosporus*, Fr., would induce us to bring it under the same species. We have no means of comparing *A. rufopallidus*, Karsten, with *A. vinosus*, B., nor his *A. lapponicus* with *A. glaber*, P., as given by Rabenh. (F. E. exsicc. No. 778), nor *A. difformis*, Karsten, with *A. testaceus*, B. & Br.; but it is not improbable that they are synonymous. *A. carneus*, P., according to Finnish specimens, has larger fruit than *A. granuliformis*, Crouan, to which species we have been hitherto disposed to refer it.

Notes on a few Sphæriacei are given in an Appendix. *Sphæria mammata*, Wahl. = *Sphæria (Hypoxyylon) multiformis*, Fr. *S. duplicella*, Nyl., is new. *S. vicinula*, Nyl., and *S. pruniiformis*, Nyl., *S. sorbina*, Nyl., and *S. dacrymycella*, Nyl., have been published in the 'Flora.'

A full index of species, varieties, and synonyms completes the work.

In concluding our notice of Prof. Nylander's treatise we will only add that it is a record of observations quite essential to every botanist who wishes to study the genus *Peziza*, containing also numerous remarks bearing on the proper method to be pursued in investigating natural history in general; and as such we would recommend it strongly to all who are interested in that study.